Week 3 - Satisfaction Theory II

Satisfaction Theory II

The idea of **context** in file change semantics is actually an extension of the Stalnakerian approach, with several innovations:

Context is not merely seen as a set of possible worlds, but a set of assignment-world pairs $\langle g, w\rangle$. The assignment function g maps discourse referent variables to individuals in a world. This is what motivates the analysis for anaphora that dynamic semantics was built around, as the assignment function allows us to track the discourse referents.

(1) A context c is a set of assignment-world pairs such that: (From Yasu's handout)

a. $\{w | \exists g[\langle g, w\rangle \in c]\}$ is the Stalnakerian Context Set;

b. For any $\langle g, w\rangle$,$\langle g, w'\rangle \in c$, dom$(g)$ = dom(g')[1]

So, our previous Stalnakerian context set denotation can be updated to something along the lines of (2).

(2) $c[\alpha] = \{ \langle g, w\rangle \in c \mid [\alpha] = 1 \text{ in } w\}$
$c[\text{it's raining}] = \{\langle g, w\rangle \in c \mid \text{it is raining in } w\}$

Presuppositions in Quantified Sentences

Quantified sentences can be decomposed into two parts:

- **The Restrictor**: The set over which the quantifier ranges.
- **The Nuclear scope**: The predicate that says what is true of those individuals.

(3) Every **dog** **barked**.

In this case, the set being quantified is ⟦dog⟧, and the predicate that holds for this set is ⟦barked⟧. This distinction comes from **Generalised Quantifier Theory** , and is used to denote quantifiers as a function from two predicates:

(4) $[\![\text{every}]\!]_{\langle\langle et,t\rangle,\langle\langle e,t\rangle,t\rangle\rangle} = \lambda \text{R}.\lambda \text{S}.\forall[\text{R}(x) \rightarrow \text{S}(x)]$
$[\![\text{Every dog barked}]\!] = \forall x[\text{dog}(x) \rightarrow \text{bark(x)}]$

[1] This part of the formula makes sure all assignments in the context have the same domain e.g.,
$g = \{1 \mapsto \text{Tim}, 2 \mapsto \text{Jisu}, 3 \mapsto \text{Saki}\}$
$\Longrightarrow$ dom(g)1,2,3 requires that every world in the context agrees on these discourse references existing.

How do presuppositions project when the presupposition trigger is in different parts of a quantified sentence?

(5) Every **student in Chandler House** **stopped** **coming to class**.

(6) Every **student in Chandler House who stopped coming to class** **is on holiday**.

Question: Does (5) and (6) presuppose that every student used to come to class?

Universal Quantifier
What about generalised quantifiers in dynamic semantics? That's tricky, here is an example denotation Yasu made a while ago:

(7) a. $c \in \text{dom}([\text{every}^i \phi\psi])$ only if $i \notin \text{dom(c)}$
b. Whenever defined, $c[\text{every}^i \phi\psi]$

$$= \left\{ \langle g, w \rangle \in c \;\middle|\; \begin{array}{l} \{ g'(i) \mid \langle g', w \rangle \in c[a^i][\phi] \wedge g \leqslant g' \} \\ \subseteq \{ g''(i) \mid \langle g'', w \rangle \in c[a^i][\phi][\psi] \wedge g \leqslant g'' \} \end{array} \right\}$$ [2]

(8) $g \leqslant g'$ iff for each $i \in \text{dom}(g)$, $g(i) = g'(i)$.

(9) Whenever defined, c [Every^3 x_3 boy x_3 danced]
$= \{ \langle g, w \rangle \in c \mid$ the set of boys in w is a subset of boys who danced in w.

Summary: (7-a) is the **definedness condition**; which basically makes sure that i introduces new discourse variables.

(7-b) claims that the top set representing the set of individuals assigned to i who make the restrictor ϕ true in world w must be a subset of the bottom set of individuals assigned to i who make both the restrictor ϕ and scope ψ true in world w. In other words, the context set is updated to $\langle g, w \rangle$ in which the restrictor set is a subset of the restrictor set + scope set. is the **assignment extension**, basically stating that g' can extend g with more variables as long as g' already agrees with g.

So what does this predict for presuppositions in quantified sentences? In file change semantics, a sentence with a presupposition can only update a context if the presupposition is already satisfied in the context. $c[\text{every}_i \phi\psi]$ depends on computing both $c[a_i][\phi]$ and $c[a_i][\phi][\psi]$, so the presuppositions in ϕ and ψ have to be satisfied for all relevant assignments used in those computations. This yields for the following predictions:

- In **Restriction presuppositions** (ϕ), the presupposition must hold for all individuals in the context since $c[a_i][\phi]$ ranges over all possible individuals.
- in **Scope presuppositions** (ψ), the presupposition must hold for all individuals that make ϕ true since $c[a_i][\phi][\psi]$ is computer for that restricted set.

[2]This general formula can be adapted for other generalised quantifiers.

Lets look at (5). We check all possible x_3 (students) for each assignment in $c[a_3][\phi]$. When we then compute $c[a_3][\phi][\psi]$'s presupposition must be satisfied for each x_3 that made ϕ true (each student). All in all, we predict that the sentence will presuppose that **Every student used to go to Chandler House**.

For (6), since $c[a_3][\phi]$ is computer before we restrict x_3 to those who satisfy ϕ, the presupposition of ϕ must already be satisfied for every possible x_3 in the domain. This would predict that the sentence presupposes that **Every individual (student or not) used to go to Chandler House.** This is clearly wrong!!

Indefinites and Pronouns

To talk about indefinite expressions with presuppositions we have to talk about the **indefinite article** and **pronouns**. Sentences with indefinites introduce new discourse referents in File Change Semantics:

(10) $$c[a^5 \text{ girl smiled}] = \left\{ \langle\, g[5 \to x],\ w \,\rangle \;\middle|\; \begin{array}{l} \langle g, w\rangle \in c, \\ x \text{ is a girl in } w \text{ and smiled in } w \end{array} \right\}$$

To summarise this formula, the left hand side represents the resulting c after an update. $g[5 \mapsto x]$ is the **new assignment**, basically extending g by assigning x to variable 5 (same as g but now 5 refers to x). So each pair $\langle g[5 \mapsto x], w\rangle$ represents a new possible discourse situation where the indefinite has introduced a new referent.

(11)
w_1 : Only Jisu and Saki are girls who smiled.
w_2 : Only Jisu smiled.
w_3 : No girl smiled :(.

$$\left\{ \begin{array}{l} (\langle\{3 \to a,\ 7 \to b\},\ w_1\rangle), \\ (\langle\{3 \to b,\ 7 \to a\},\ w_1\rangle), \\ (\langle\{3 \to b,\ 7 \to c\},\ w_2\rangle), \\ (\langle\{3 \to a,\ 7 \to c\},\ w_2\rangle), \\ (\langle\{3 \to a,\ 7 \to b\},\ w_3\rangle), \\ (\langle\{3 \to d,\ 7 \to b\},\ w_3\rangle), \\ (\langle\{3 \to c,\ 7 \to c\},\ w_3\rangle), \end{array} \right\} \left[\, a^5 \text{ girl smiled} \,\right] = \left\{ \begin{array}{l} (\langle\{3 \to a,\ 5 \to \text{Jisu},\ 7 \to b\},\ w_1\rangle), \\ (\langle\{3 \to a,\ 5 \to \text{Saki},\ 7 \to b\},\ w_1\rangle), \\ (\langle\{3 \to b,\ 5 \to \text{Jisu},\ 7 \to a\},\ w_1\rangle), \\ (\langle\{3 \to b,\ 5 \to \text{Saki},\ 7 \to a\},\ w_1\rangle), \\ (\langle\{3 \to b,\ 5 \to \text{Jisu},\ 7 \to c\},\ w_2\rangle), \\ (\langle\{3 \to a,\ 5 \to \text{Jisu},\ 7 \to c\},\ w_2\rangle) \end{array} \right\}$$

Pronouns **presuppose that their discourse referent are already defined in the assignment**. So for something like 'she$_5$', the index 5's variable must be in the domain of the of the current assignment g and $g(5)$ is a female in w. This forms the presupposition condition:

(12) c presupposes she$_5$ was angry iff. for each $\langle g, w\rangle$, $5 \in \text{dom}(g)$, and $g(5)$ is female in w.

The actual context update keeps only worlds where the female referent is angry:

(13) $c[\text{she}_5 \text{ is angry}] = \{\langle g, w\rangle \in c \mid g(5) \text{ was angry in } w\}$.

(14)
w_1 : Only Cathy and Erying were angry.
w_2 : Only Cathy was angry.
w_3 : No one is angry.

(15)

$$\left\{\begin{array}{l} (\langle[1 \to a,\ 5 \to \text{Cathy}],\ w_1\rangle), \\ (\langle[1 \to a,\ 5 \to \text{Erying}],\ w_1\rangle), \\ (\langle[1 \to a,\ 5 \to \text{Jisu}],\ w_1\rangle), \\ (\langle[1 \to b,\ 5 \to \text{Cathy}],\ w_1\rangle), \\ (\langle[1 \to b,\ 5 \to \text{Erying}],\ w_1\rangle), \\ (\langle[1 \to a,\ 5 \to \text{Cathy}],\ w_2\rangle), \\ (\langle[1 \to b,\ 5 \to \text{Erying}],\ w_2\rangle), \\ (\langle[1 \to b,\ 5 \to \text{Saki}],\ w_2\rangle), \\ (\langle[1 \to c,\ 5 \to \text{Erying}],\ w_3\rangle), \\ (\langle[1 \to c,\ 5 \to \text{Erying}],\ w_3\rangle) \end{array}\right\} \big[\text{she}_5 \text{ was angry}\big] = \left\{\begin{array}{l} (\langle[1 \to a,\ 5 \to \text{Fred}],\ w_1\rangle), \\ (\langle[1 \to a,\ 5 \to \text{George}],\ w_1\rangle), \\ (\langle[1 \to b,\ 5 \to \text{Fred}],\ w_1\rangle), \\ (\langle[1 \to b,\ 5 \to \text{George}],\ w_1\rangle), \\ (\langle[1 \to a,\ 5 \to \text{John}],\ w_2\rangle) \end{array}\right\}$$

We can see context set both before and after above!

Presupposition Projection Through Indefinites
Presupposition trigger in the nuclear scope:

(16) A^1 x_1 fat man x_1 was pushing his_1 bike A famous example from Heim (1983)

Starting with the restrictor, we know that for each $\langle g, w\rangle \in c[a^i][x_1\text{fat man}]$, $g(1)$ is a fat man in w. In other words, after we process '$x1$ fat man', we have introduced 'a' and now filtered to keep only those assignments where x_1 is a fat man. So the new context $c[\text{a}^1][x_1$ fat man$]$ is every $\langle g, w\rangle$ pair such that $g(1)$ is a fat man in w.

For the nuclear scope, since we have a presupposition, this theory further predicts that c presupposes that x_1 was pushing his bike iff. for each $\langle g, w\rangle \in c, 1 \in \text{dom(g)}$ and $g(1)$ had a bike in w and $g(1)$ was male in w. so $c[x_1$ was pushing his_1 bike$]$ $\{\langle g, w > \in \text{c} \mid g(1)$ was pushing $g(1)$'bike in $w\}$. Then:

(17) $c[a^1][x_1\text{man}]$ presupposes that x_1 was pushing his_1 bike] iff for each $\langle g, w\rangle \in c$, for each $\langle g[1 \mapsto b], w\rangle$ where m is a man in w, m had a bike in w (and m is male in w).

This is problematic, it essentially requires that every possible x_1 introduced by 'a^1 fat man' has a bike before we evaluate the nuclear scope. So the presupposition is that **every fat man has a bike**. This is also clearly wrong!!!

Heim's solution is to suggest that the presupposition becomes *at-issue* after it is accommodated in the restrictor. This, in essence, stipulates that the meaning of the (16) is the same as: 'A fat man owned a bike and and was pushing it.' However, this explanation fails as the content is clearly presuppositional and not *at-issue* as it still projects.

Beaver's fix
Beaver (2001) believes that these presuppositions are existential e.g., '**every** girl pushed her bike' does not presuppose that every girl has a bike, but rather that each girl who is relevantly being talked about has a bike (existential within the restriction). In other worlds: There is at least one girl who has a bike, and for each girl considered, she has a bike.

(18) $c\restriction_{9\mapsto Saki} = \{\langle g, w\rangle \in c \mid g(9) = \text{Saki}\}$

First, he chops up the context where variable 9 assigns Saki, then checks the presupposition inside the quantifiers. Finally, it updates the sentence by taking the union of all updated 'slices' c and combine the individual slices of the context that correspond to assignments of variables 1 to some 'a' in which the presupposition is satisfied.

The Proviso Problem

Considering the following conditional sentences which have presupposition triggers in the consequence:

(19) If Nathan isn't tired, he'll bring his surfboard.
$\rightarrow$ Nathan has a surfboard.
$\nrightarrow$ If Nathan isn't tired, he has a surfboard.

(20) If Joseph is a PhD student, he'll work on his thesis.
$\rightarrow$ Joseph has a thesis.
$\rightarrow$ If Joseph is a PhD student, he has a thesis.

It seems as though (19) simply presupposes that Nathan has a surfboard while **??** presupposes both that Joseph has a thesis and a weaker conditional presupposition that if Joseph was a student he would have a thesis.

Recall the analysis for conditional sentences in satisfaction theory.

(21) $c[\text{if } \phi, \text{ then } \psi] = c - (c[\phi] - c[\phi][\psi])$

paraphrase: Updating with 'if then ϕ ' removes from the context all worlds where holds but ϕ doesn't.

for the case of (19), ψ has a presupposition. When computing $c[\phi][\psi]$, the presupposition must already be satisfied in $c[\phi]$. Since you compute $c[\phi][\psi]$ with a restricted context set from $c[\phi]$, you assume the presupposition holds in worlds where ϕ is true. This only gives me the conditional presupposition reading which is not what we get from (19)!

This issue is still an ongoing debate, at the provisio problem is not only a problem for satisfaction theory but also other frameworks that take into account presuppositions.

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List of References

Heim, Irene (1983). "On the projection problem for presuppositions". *In WCFL 2*: 114–125.